

## Claims

1. Binders for radiation-curable water-based paints, comprising reaction products **ABCDE** of epoxy compounds **A** having at least two epoxide groups per molecule, 5 unsaturated fatty acids **B**, olefinically unsaturated monomers **C**, unsaturated aliphatic compounds containing hydroxyl groups, **D**, and polyfunctional isocyanates **E**, characterised in that the compounds **A** are bonded to the compounds **B** by a beta-hydroxyester bond and the 10 compounds **C** at least partially form grafts on the adducts **AB** to give compounds **ABC**, in that the compounds **D** are bonded to the compounds **E** by a urethane group to give semicapped isocyanates **DE**, and in that the compounds **ABC** are bonded to the compounds **DE**, likewise with urethane 15 formation.

2. Binders according to Claim 1, characterised in that the epoxy compounds **A** are selected from the group consisting of ethers of glycidyl alcohol with dihydric or more than dihydric alcohols having from 2 to 20 carbon 20 atoms, ethers of glycidyl alcohol with polyethylene or polypropylene glycol, esters of glycidyl alcohol with dibasic or more than dibasic aliphatic carboxylic acids, and diglycidyl ethers of bisphenol A, bisphenol F, dihydroxybiphenyl and dihydroxydiphenyl sulfone, and 25 addition products of the said diepoxides with difunctional or more than difunctional hydroxyl compounds.

3. Binders according to Claim 1, characterised in that the unsaturated fatty acids **B** are linear or branched 30 aliphatic monocarboxylic acids and have at least one olefinic double bond and from 6 to 30 carbon atoms.

4. Binders according to Claim 1, characterised in that the olefinically unsaturated monomers **C** contain a mass fraction of at least 10 % of an olefinically unsaturated 35 acid.

5. Binders according to Claim 1, characterised in that the unsaturated aliphatic compounds containing hydroxyl groups, **D**, are esters of dihydric or more than dihydric alcohols with monomers containing olefinically unsaturated acid groups.

6. Binders according to Claim 1, characterised in that the polyfunctional isocyanates **E** are aromatic, aliphatic and mixed aromatic-aliphatic isocyanates having at least two isocyanate groups.

10 7. A process for the preparation of binders according to Claim 1, characterised in that

15 - in the first step, the epoxy compounds **A** are reacted with the unsaturated fatty acids **B** to give adducts, at least 0.5 mol of acid groups in the fatty acids **B** being used per 1 mol of epoxide groups in **A**,

20 - in the second step, the adducts **AB** formed in this way are reacted with the olefinically unsaturated monomers **C** in the presence of free radical initiators, the compounds **C** polymerising and at least partially forming grafts on the adducts **AB**,

25 - in a separate third step, semicapped isocyanates **DE** are prepared by reacting the hydroxy-functional, olefinically unsaturated monomers **D** with the polyfunctional, preferably difunctional, isocyanates **E**, and

- in the fourth step, the isocyanates **DE** are reacted with the graft copolymers **ABC** formed in the second step to give the products **ABCDE** by urethane formation.

30 8. The process according to Claim 7, characterised in that a ratio of at least 0.7 mol/mol is chosen in the first step.

9. The process according to Claim 7, characterised in that a ratio of the amount of substance of isocyanate

groups in **DE** to the amount of substance of hydroxyl groups in **B** of 0.2 to 0.9 is chosen in the fourth step.

10. The process according to Claim 7, characterised in that the ratio of the amounts of substance in the fourth  
5 step is chosen so that the reaction product **ABCDE** has an acid number of from 5 mg/g to 80 mg/g.

11. A method of use of binders according to Claim 1 for the preparation of radiation-curable coating agents for wood, metal and plastics, comprising mixing the binders  
10 according to Claim 1 and photoinitiators.

12. The method of use according to Claim 11, comprising admixing aqueous acrylate dispersions.